

# **O<sub>3</sub> Welfare Assessment Plan: Scope and Methods for Exposure Analysis and Risk Assessment**

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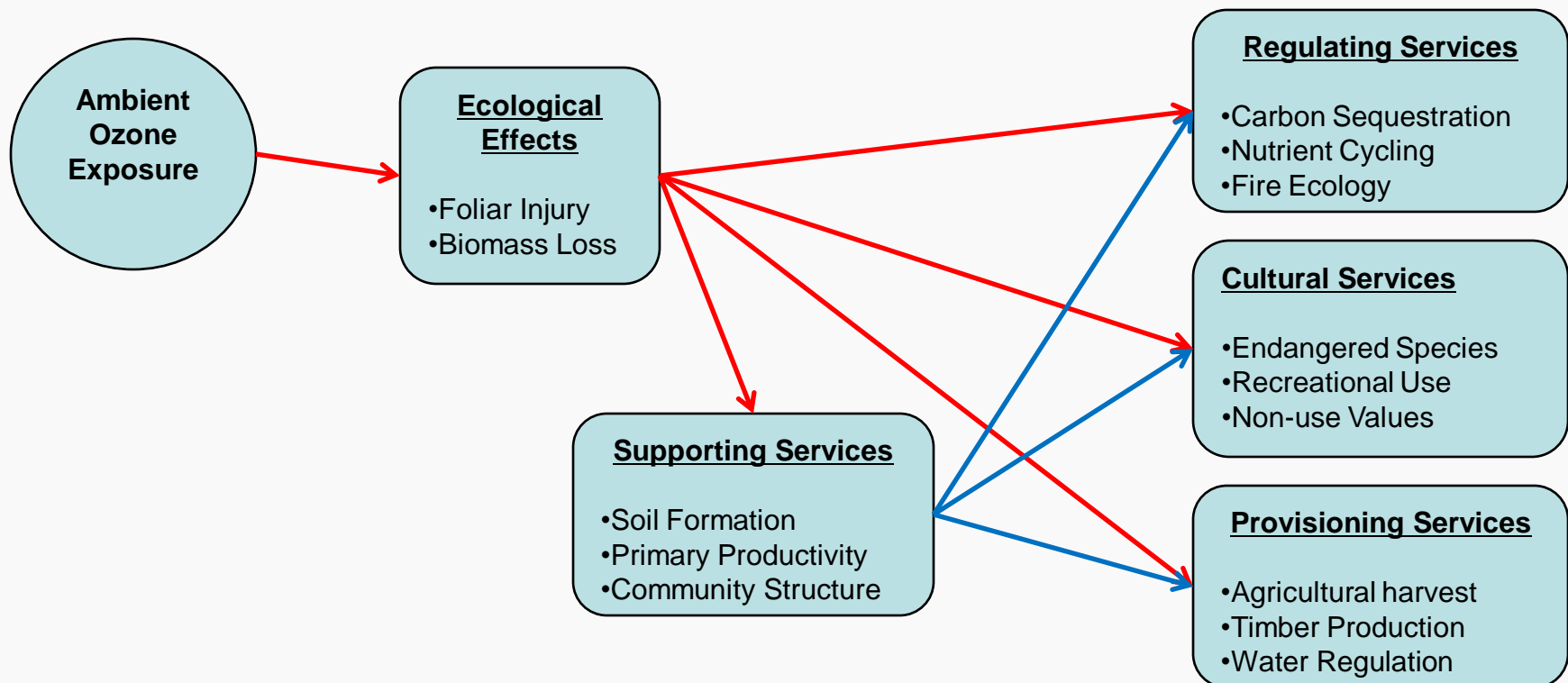
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## Background for Secondary Standard

- After the review completed in 2008, the secondary NAAQS for ozone was set as identical to the primary standard
- The current reconsideration has proposed a separate secondary standard using the W126 metric

# Ecosystems Services Framework





# National Ozone Exposure Surface for Welfare Effects

- Need to interpolate exposure to include areas with few or no monitors
- Modeled Attainment Test Software (MATS)
  - 2005 CMAQ ambient modeled data (12 km grids)
  - Monitor data (2004 to 2006)
- Voronoi Neighbor Averaging (VNA) interpolation
  - Generated in BenMAP
  - Uses more recent monitor data (2008 to 2010)



# Ecological Effects

- Biomass Loss
  - Concentration-Response (C-R) functions for 11 tree species from NHEERL-WED
  - USDA Forest Service Forest Inventory and Analysis (FIA) data for species growing ranges
- Foliar Injury
  - Incidence data from Forest Health Monitoring Program (FHM) and FIA data
  - National Park Service ozone sensitive species list
- Agricultural Data
  - C-R functions for domestic crop species (NCLAN data)



# National Scale Vegetation Effects

- Potential biomass loss surface
  - C-R functions for 11 tree species
  - Ozone exposure surface
  - FIA species range data
- National foliar injury occurrence maps
- Endangered species critical habitat



# Ecosystem Services

- Models for Ecosystem Services
  - AGSIM - Economic valuation of agricultural yields for NCLAN crops
  - FASOM – Economic valuation for agricultural yields as well as timber species
  - i-Tree – Forest Service model for urban ecosystem services
    - VOC emissions
    - Building energy use
    - Pollution removal
    - Carbon storage and sequestration



# Case Study Areas

- Use selected case study areas to generate more refined analyses of ecological effects
- More refined ecological analyses will allow for additional analyses of ecosystem services that are more difficult to quantify with existing models (e.g. Cultural services)
- Selection Criteria
  - Occur in area with expected elevated ozone levels
  - Availability of vegetation mapping, including estimates of species cover
  - Adequate geographic coverage including urban and natural settings
  - Occurrence of ozone sensitive species





# National Parks

- NPS Data
  - Comprehensive vegetation mapping in conjunction with USGS
  - Ozone sensitive species list for National Park units
  - Trail and recreational area GIS data
  - Recreational use data
- Potential Parks
  - Great Smoky Mountains NP
  - Rocky Mountain NP
  - Kings/Sequoia NPs
- Possible Ecosystem Level Metrics
  - Percent vegetation cover affected by foliar injury
  - Percent of recreation areas affected by foliar injury and biomass loss
  - Estimates of species specific biomass loss within NP unit



# Urban Areas

- Potential urban areas with adequate resource data
  - San Diego County Multiple Species Conservation Plan (MSCP)
  - Boulder, Colorado regional planning data
- Ecosystem services
  - Similar to National Park areas
  - May be able to include wetlands specific information for sediment retention, flood control and nutrient cycling
- i-Tree Model